

Final Exam Practice

1)

A dam has the shape of the trapezoid shown in Figure 2. The height is 20 m and the width is 50 m at the top and 30 m at the bottom. Find the force on the dam due to hydrostatic pressure if the water level is 4 m from the top of the dam.

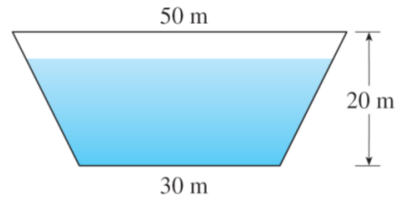


Figure 2

2)

The demand for a product, in dollars, is

$$p = 1200 - 0.2x - 0.0001x^2$$

Find the consumer surplus when the sales level is 500.

Evaluate the integral.

3)

$$\int_1^2 \frac{x}{(x+1)^2} dx$$

4)

$$\int \frac{dx}{\sqrt{e^x - 1}}$$

5)

$$\int \frac{\sec^6 \theta}{\tan^2 \theta} d\theta$$

6)

$$\int \tan^5 \theta \sec^3 \theta \, d\theta$$

7)

$$\int \frac{e^{\sin x}}{\sec x} \, dx$$

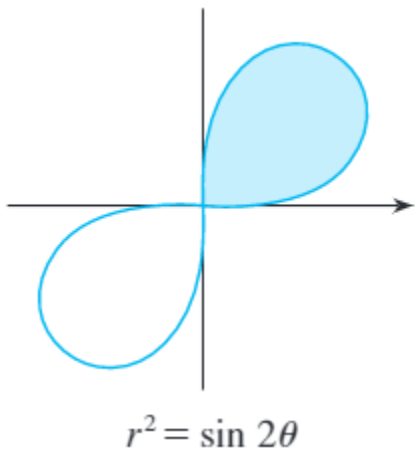
Find dy/dx and d^2y/dx^2 . For which values of “t” is the curve concave upward?

8)

$$x = t^2 + 1, \quad y = t^2 + t$$

Find the area of the shaded region.

9)



Sketch the curve and find the area that it encloses.

10)

$$r = \sqrt{1 + \cos^2(5\theta)}$$

Determine whether the series is convergent or divergent.

11)

$$\sum_{n=1}^{\infty} \frac{n^3}{5^n}$$

12)

$$\sum_{n=2}^{\infty} \frac{1}{n\sqrt{\ln n}}$$

13)

$$\sum_{n=1}^{\infty} (-1)^{n-1} n^{-3}$$